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Biomass, Wood, Energy, Bioproducts research unit

DEVELOPMENT OF INNOVATIVE ALTERNATIVE CROPS FOR THE PRODUCTION OF NATURAL RUBBER

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Adaptation of the guayule to Mediterranean climate: characterization and enhancement of genetic diversity

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The objective of Agroguayule project (co-financing ADEME, Call for projects GRAINE) is to select lines that combine good adaptation to the Mediterranean climate (dry and cold), high vegetative vigour and a high concentration in natural rubber. Guayule varieties are mainly apomictically propagated. The descendants are homogeneous. However, since apomixis is facultative, there is some diversity in the descendants.

In our studies, we started with a very low initial genetic diversity (5 cultivated varieties, uncultivated diploids and close relatives of *P incanum*). First of all, we checked the ploidy of the accessions available as well as their pollen fertility. In complement, we looked for and characterized off-types in the progeny of these 5 cultivated varieties.

On nearly 100 selected off-types, we observed a high variation of ploidy levels (3X to 7X) compared to the initial cultivars. Our preliminary observations on agro-morphological features of these off-types (growth, foliar development, plant habit...) have shown that there is no relationship between the level of ploidy and plant vigour. These results raise questions about the formation of polyploid gametes (2N) in the guayule. This question will be addressed by comparing parental and polyploid descendant genotypes.

Additional studies on parents and the most outstanding offsprings are ongoing in a plant-by-plant using analytical chemistry, fingerprinting metabolomics and SPIR spectroscopy. First, overall classification of plants will be performed. Then, we will focus on rubber biosynthesis according to seasonality, distribution and concentration in plants (bark, leaf, flower, wood) according to agro-climatic conditions.

The outputs of this work will contribute to better design and implement a seed field. It also aims to select varieties that are more productive and better adapted to the cold and water deficit conditions characteristic of the Mediterranean climate.

Subject: oral
Topics: Agronomy
Keywords: guayule; abiotic stress; ploidy; phenotyping